

## Abstract

An adaptive equalizer finite impulse response (FIR) filter for high-speed communication channels with modest complexity, where the filter is iteratively updated during a training sequence by a circuit performing the update:

$\bar{h}(t+1) = \bar{h}(t) + \mu[\text{sgn}\{d(t)\} - \text{sgn}\{z(t) - Kd(t)\}]\text{sgn}\{\bar{x}(t)\}$ , where  $\bar{h}(t)$  is the filter vector representing the filter taps of the FIR filter,  $\bar{x}(t)$  is the data vector representing present and past samples of the received data  $x(t)$ ,  $d(t)$  is the desired data used for training,  $z(t)$  is the output of the FIR filter,  $\mu$  determines the memory or window size of the adaptation, and  $K$  is a scale factor taking into account practical limitations of the communication channel, receiver, and equalizer. Furthermore, a procedure and circuit structure is provided for calibrating the scale factor  $K$ .